Cambridge Transactions	Scientific Papers	Read	Instead of
p. 79, l. 6 f. b.	p. 224, l. 6 f. b.	$\frac{Nn'^2}{RR'}\frac{dF}{dt}$	$N\frac{n'^2}{R'}\frac{dF}{dt}$
p. 81, l. 11 ,,	p. 226, l. 1 ,,	$\nabla^2 p_2$	$\nabla^2 p$
,, ,, 2 ,,	corrected	$-\frac{1}{4\pi}\frac{I}{2}\cos\theta\omega y$	$\frac{1}{4\pi}\frac{I}{2}\cos\theta\omega y$
p. 82, l. 4 f. a.	,, ,,	$k\left(\frac{da_2}{dy}-\frac{db_2}{dx}\right)$	$k\left(\frac{du_2}{dy}-\frac{dv_2}{dx}\right)$
,, ,, 9 ,,	,, ,,	$p_2 = \frac{I\omega}{16\pi}\left[-\left(x^2+y^2\right)\cos\theta + xz\sin\theta\right]$	$p_2 = \frac{I\omega}{16\pi}\left[\left(x^2+y^2\right)\cos\theta - xz\sin\theta\right]$
,, ,, 14 ,,	p. 228, l. 6 f. a.	$\frac{TR^4}{48\pi k}\omega I\sin\theta$	$\frac{TR^3}{48\pi k}\omega I\sin\theta$
,, ,, 9 ,,	,, ,, 14 f. b.	I	I_1
,, ,, 7 ,,	,, ,, 12 ,,		
,, ,, 3 ,,	,, ,, 7 ,,		
p. 83, l. 3 ,,	,, ,, 2 ,,		
p. 82, l. 3 f. b.	,, ,, 7 ,,	TR	T
,, ,, 2 ,,	,, ,, 6 ,,		
p. 83, l. 3 f. a.	,, ,, 2 ,,		
,, ,, 4 ,,	,, ,, 1 ,,		
,, ,, 12 ,,	p. 229, 8 f. a.		
,, ,, 6 ,,	,, ,, 1 ,,	$\operatorname{cotg}\phi = -\frac{TR\omega}{24\pi k}$	$\operatorname{cotg}\phi = -\frac{TR^3\omega}{24\pi k}$
,, ,, 6 ,,	,, ,, 1 ,,	$I' = \frac{1}{2}\frac{\frac{TR\omega}{24\pi k}}{\sqrt{1+\left(\frac{TR\omega}{24\pi k}\right)^2}}I\sin\theta$	$I' = \frac{1}{2}\frac{\frac{T}{24\pi k}\omega}{\left(\sqrt{1+\frac{T}{24\pi k}\omega}\right)^2}I_1\sin\theta$
,, ,, 7 f. b.	,, ,, 9 f. b.	$\frac{1}{2}\frac{T\omega R^4 I\cos\theta}{\sqrt{(24\pi k)^2 + T^2R^2\omega^2}}$	$\frac{1}{2}\frac{T\omega R^3 I\cos\theta}{\sqrt{(24\pi k)^2 + T^2u^2}}$
,, ,, 5 ,,	,, ,, 6 ,,	$\frac{12\pi kT\omega R^4I^2\cos^2\theta}{(24\pi k)^2 + T^2R^2\omega^2}$	$\frac{12\pi kT\omega R^3I^2\cos^2\theta}{(24\omega k)^2 + T^2\omega^2}$
,, ,, 3 ,,	,, ,, 4 ,,	$\frac{12\pi kT\omega^2R^4I^2\cos^2\theta}{(24\pi k)^2 + T^2R^2\omega^2}$	$\frac{12\pi kT\omega^2R^3I^2\cos^2\theta}{24\pi k + T^2\omega^2}$

Vienna, October 25. LUDWIG BOLTZMANN.

The Late Dr. Haughton.

IN your account of the late Dr. Haughton, as well as in those written of him elsewhere, I see no mention of a somewhat fantastic instance of his versatility—namely, his investigation into the most merciful way of hanging criminals. It was, I believe, entirely owing to him that the present method of the "long drop" was introduced. According to the older method the rope was so arranged that the culprit fell barely knee deep, all the rest of his body being in view above the scaffold. He died usually by strangulation, sometimes combined with apoplexy, after what seemed to be a protracted agony Now, he is allowed to fall through some 10 feet, more or less, according to his estimated bulk and weight, and he dies with a broken neck more painlessly than virtuous persons in their own beds. The problem was to find out the length of drop that would suffice to break the neck bone, but would be insufficient to tear off the head. Dr. Haughton experimented on the tensile strengths of the spine and of the muscles, and he published a formula for the length of drop, dependent on the height and weight of the culprit. In this, I thought he had omitted a small factor, and wrote to him about it—namely, the increased sectional area the muscles of the neck in fat men. It should be mentioned that a case actually occurred in which the drop was too deep, and the head of the criminal became wholly detached, and the legal doubt arose whether under those circumstances the sentence of being "hanged by the neck" had been duly carried out. I regret much that I have to write wholly from memory now, which I trust has not deceived me. It is very possible that Dr. Haughton's formula may be found in one of the earlier numbers of NATURE. F. G.

The Supposed Dowsing Faculty.

PERMIT me to guard your readers against a misapprehension likely to be caused by the review in NATURE of October 14, of an investigation I have recently published on the alleged existence of a faculty for finding underground water, a power claimed by certain persons called "diviners" or "dowsers."

The reviewer states twice over that the "bulk of the paper is taken up with hearsay evidence," and again that it is "an accumulation of second-hand evidence," and that I do not give "enough weight to the natural tendency of mankind to conceal their failures." If these statements could be justified I should agree with your reviewer that my investigation "leaves the subject in the same state as it found it." But the peculiar meaning your reviewer attaches to the words he employs, and hence the value of his opinion, may be inferred from the following facts:—

Six years ago I was asked by the Council of the Society for Psychical Research to examine this question. I had, therefore, in addition to experiments which I myself conducted, to take the place of a judge in a court of inquiry, and give weight to no evidence but that of *eye-witnesses;* and so, in almost every one of the 152 numbered cases *pro* and *con* that are given in my paper, I quote such written and signed evidence, independent of the dowser himself. These witnesses are mostly men of good position, or wide experience, and to whom the question of obtaining water was a matter of practical importance and pecuniary outlay. The argument that some of them were biassed is a perfectly fair criticism, if true, but the bias was usually more on the side of incredulity than of credulity; take, *e.g.* the extreme scepticism of Mr. Richardson, the employer in the remarkable Waterford case, and of Sir Henry Harben in that at Warnham.[1] No evidential value is

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[1] It may well be urged that a man would not employ a dowser unless he were already biassed in his favour. But the gentlemen named above, and several other witnesses I have cited, consented to this course, either to gratify their friends, or as a *dernier ressort*, only after scientific advice and large expenditure on boring had failed to find the water supply they needed. Their attitude towards the dowser when he arrived was that of ill-disguised contempt. How far "lucky hits" or "mother wit" can explain the dowser's success in these and other cases, the reader of my paper must judge for himself.

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attached in my paper to any case not fully corroborated, and out of scores of such cases received some half-dozen have been published, as is expressly stated in my paper, in order to elicit further information on account of their intrinsic interest.

As regards the liability to overlook failures, I have referred to this point both at the outset of my paper (p. 4) and elsewhere; further (on pp. 238 and 239), I state: "It must be borne in mind that (especially among amateur dowsers) one is more likely to hear of success than failure, and therefore an extensive and searching inquiry is necessary before any safe induction can be drawn. . . . All that was possible in the present investigation was to make the range of evidence as wide and unbiassed as possible, and not exclude a single case of failure that was substantiated. This has been done." It is, of course, easy to select, as your reviewer does, a certain number of cases in which the failures exceed the successes.[1] But I think one is more likely to arrive at a correct estimate by the method I adopted, which was to make extensive inquiries, both generally and specifically, with regard to failures as well as successes in the case of every professional dowser I heard of. This is naturally a vastly more laborious method than your reviewer's, but was necessary in order to arrive at the actual facts in a subject which from all sides has been loosely discussed, albeit by eminent men, for upwards of 200 years.

I am glad to find your reviewer endorses certain cautions I suggested in the event of further investigation; though what he means by "thought-reading" as a source of error is not quite clear. It is a matter of importance, more so than your reviewer appears to imagine, to recognise, and if possible exclude, the aid which the dowser derives from indications given by the surface of the ground. Long practice may give the most illiterate person a power of detecting surface indications of underground water, or the faint tremor of unseen running water, that would entirely escape the ordinary observer, and of enabling correct inferences to be drawn even from indications that the dowser may have noticed quite unconsciously. We have here, doubtless, the explanation of some of the singular successes of dowsers in finding water; but a careful examination of the evidence I have collected has led me to think that no explanation hitherto suggested is adequate to account for all the facts.[2]

Kingstown, Co Dublin, October 21. W. F. BARRETT.

AT the head of Prof. Barrett's memoir is the following quotation from Mr. Andrew Lang: "There are two ways of investigating the facts or fancies about the divining rod. One is to examine it in its actual operation—a task of considerable labour, which will doubtless be undertaken by the Society for Psychical Research; the other, and easier way, is to study the appearances of the divining wand in history." This naturally led me to think that Prof. Barrett intended to treat the subject as, in the main, a matter for personal investigation. He now claims, however, "to take the place of a judge in a court of inquiry." I therefore withdraw the term "hearsay" applied to the bulk of the evidence he has so laboriously collected, and will accept his own view of his position.

But Prof. Barrett will agree with me that this is a technical investigation needing expert knowledge. Now if so, where does the necessity for expert knowledge come in? Surely not after the experiments have all been made, and the dowser is off the scene; but, as in any other scientific investigation, on the spot, with the man and the conditions all before you. This is the very core of the investigation, and no amount of after analysis can atone for the lack of *personal* observation and judgment exercised at this, the crucial point. But here, where expert knowledge and observation are essential, he relies on others, of whom the majority have no previous knowledge or scientific training whatever.

Prof. Barrett "had to exclude all evidence but that of *eye-witnesses*." As to his "152 numbered cases," 9 are avowedly supplied by people who, on their own statement, do *not* appear to be eye-witnesses. In 41 more there is nothing to show whether his informant met the dowser himself, or is trusting to information received from others. The information in 8 of these comes from a firm or joint-stock company; 8 are merely newspaper reports; some are ancient cases, which cannot now be inquired into.

With reference to the statement regarding liability to overlook failures, I did not state or wish to imply that Prof. Barrett had not fairly given all the failures which came to his knowledge. What I did wish to imply was, that his method of writing to the parties concerned for evidence on this point was not likely to yield much result.

As to the Isle of Wight, I may say, that not making it a habit to collect information regarding the employment of dowsers in different districts, I merely alluded to one where I happened to have stumbled upon facts bearing on the question. Whether or no other districts would give similar or contrary results I cannot say, having no material to go upon.

I fail to understand what meaning Prof. Barrett attaches to the term "surface indications." He agrees with me as to their great importance; yet there are only 32 cases in which his informants make even the slightest reference to this subject, and in only 8 is there any note that Prof. Barrett made special inquiries on this all-important point.

As previously stated, my criticisms apply to the bulk of the evidence. I thoroughly recognise the value of Prof. Barrett's personal observations, and have only to regret that these experiments form so very small a part of his memoir.

THE WRITER OF THE ARTICLE.

A Proposed Memorial to Prof. Victor Meyer.

THERE appears to be a strong desire among many of the British students who worked under the late Prof. Victor Meyer, to give expression to the feelings of gratitude and admiration with which they remember him, by raising some form of memorial to be placed in the Heidelberg Lecture Theatre.

It has therefore been decided to call a general meeting of Prof. Meyer's British students, to be held in Manchester on Saturday, December 11, at 5 p.m. Prof. H. B. Dixon, F.R.S., has kindly placed the Organic Lecture Theatre of Owens College at our disposal.

All past students of the late Victor Meyer, whether they worked with him in Zürich, Göttingen or Heidelberg, are earnestly requested to be present.

I shall be pleased to receive suggestions from any who may be unable to attend, in order that they may be laid before the meeting. J. J. SUDBOROUGH.

University College, Nottingham, November 23

The Critical Temperature of Water.

CAN any of your readers tell me what is the critical temperature of water. I find in the supplement to Jamin and Bouty's "Cours de Physique" the critical temperature given as 370° C. and the corresponding pressure as 195·5 atmospheres. On the other hand, Cagniard-Latour gave this temperature as equal to the melting point of zinc, which is known to be about 415° C.

I have some theoretical grounds for believing this latter figure to be the more accurate, so should be glad to know what other determinations, if any, have been made. H. M. MARTIN.

39 Guildford Street, W.C., November 19.

Coccoliths in our Coastal Waters

IN our communication to NATURE, September 16, 1897, we say "the presence of these bodies (coccoliths) in our coastal waters does not appear to have been recorded." Since this was written we find that Dr. Wallich, in the *Ann. and Mag. of Natural Hist.*, vol. ii. 1868. p. 319, stated "Coccospheres have been met with by me profusely . . . in material collected at the surface of the open seas of the tropics, and also in dredgings from shoal water off the south coast of England"

November 18. J. JOLY.
HENRY H DIXON.

Phenomena Exhibited by Jackson Tubes.

WHILE investigating the best methods of working the ordinary form of Jackson tubes during the last fourteen months, I have noted the following interesting phenomena.

Four tubes developed a phosphorescent ring or halo rotating rapidly round the anode, which by carefully heating became comparatively steady; this I ventured to name the Saturn condition.

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[1] The reviewer is, however, delightfully free from the pedantry of those who think accuracy desirable when dealing with such a contemptible superstition as the so-called divining-rod. This, I think, is apparent already; it becomes more so when specific assertions of his are examined, such *e.g.* as "only two successes are mentioned in the Isle of Wight," &c.

[2] That a mixture of crass ignorance and charlatanry is to be found in many professional dowsers, and that some of them are little better than rogues, is only what might be expected; but, on the other hand, we have the fact that so distinguished a *savant* as M. Mortillet was once, as he tells us himself, a professional dowser, and published a book on water-finding in 1849. The President of the Royal Geological Society of Cornwall is still a successful amateur dowser.

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